(a') to (g') have been deleted.

No new matter within the meaning of § 132 has been added by any of the amendments.

Accordingly, Applicants respectfully request the Examiner to reconsider and allow all claims pending in this application.

1. Rejection of Claims 1-14 under 35 U.S.C. § 103(a)

The Office Action maintains the rejection of claims 1-14 under 35 U.S.C. § 103(a) as being unpatentable over U.S. Patent No. 3,475,369 ("Blunt") in view of either U.S. Patent No. 3,328,362 ("Roberts") or U.S. Patent No. 5,252,677 ("Tomita et al."). The Office Action states:

> Applicant argues Blunt fails to teach the claimed molar ranges. It is noted that Blunt teaches a copolymer comprising a first α-olefin of a crystallizable copolymer such as ethylene and a second α-olefin having 2 to 20 carbon atoms wherein the second α-olefin is present in an amount of 2 to 25 mole percent such that the first α-olefin would be present in an amount of 75 to 98 mole present. Applicant further argues Blunt does not teach the claimed crystallinity properties. It is noted Blunt teaches the copolymer has crystallinity less than 90%. Applicants further argue that Blunt does not teach graft modifications of the copolymer. It is noted Roberts and Tomita et al. are each cited to

teach incorporating (e.g. by grafting) into the copolymer taught by Blunt a polar monomer to form a resin composition having improved adhesiveness.

Applicants respectfully traverse the rejection because all three prongs necessary for a *prima facie* case of obviousness are not present over the newly amended claims. In particular, independent claims 1 and 7 recite a graft modified ethylene/α-olefin random copolymer having a particle diameter measured by a Coulter Counter of 1 to 50 μm. None of the cited references teach a particle size limitation within the claimed range and instead teach much smaller diameters of 0.02 to 0.5 μm. See Blunt at col. 1, line 14.

Furthermore, the presently claimed range of crystallinity of less than 30% is a non-obvious range of a broader disclosed range. Although Blunt discloses the extremely broad range of a crystallinity of 90% or less, the presently claimed range of less than 30% unexpectedly results in a graft modified ethylene/α-olefin random copolymer having a melting point of not higher than 90° C while having high adhesion strength. This unexpected combination of low fusion temperatures and high adhesion strength allows for a film made from the copolymer to be heat sealed at low temperatures.

In contrast, known resins such as those shown in the Table at

col. 14, lines 1-10 of Blunt, all have heat sealing and fusion temperatures that are **twice** the melting temperature of the presently claimed resins *e.g.* fusion temperature at 180° C. The unexpectedly low heat sealing temperature along with unexpected adhesion strength of the presently claimed invention clearly rebut an alleged *prima facie* case of obviousness.

As the Federal Circuit clearly stated in In re Chupp, evidence of superiority of a property that the claimed composition shares with the prior art can rebut a *prima facie* case of obviousness. 816 F.2d 643, 646, 2 USPQ2d 1437, 1439 (Fed. Cir. 1987). Furthermore, the Federal Circuit clearly stated that "a greater than expected result is an evidentiary factor pertinent to the legal conclusion of [non]obviousness". In re Corkill, 711 F.2d 1496, 266 USPQ 1005 (Fed. Cir. 1985).

In the present application, claim 1 recites a resin dispersion comprising:

> components derived from ethylene and an α-olefin of 6 to 20 carbon atoms, the content of the ethylene component is in the range of 75 to 97% by mol, and the content of the α-olefin component is in the range of 3 to 25% by mol, each content being based on 100% by mol of the total of both components,

the intrinsic viscosity (η) as measured in decalin at 135°C is in the range of 0.2 to 5.0 dl/g,

the crystallinity as measured by X-ray diffractometry is less than 30%,

the copolymer contains a graft component derived from a polar monomer, and the content of the polar monomer graft component is in the range of 0.1 to 15% by weight and

the particles of the copolymer have particle diameters measured by a Coulter Counter of 1 to 50 μm.

The cited references fail to teach each and every one of the claimed limitations.

In particular, the cited references fail to teach particle diameters measured by a Coulter Counter of 1 to 50 μm. For example, Blunt teaches particle diameters having much smaller diameters of 0.02 to 0.5 μm whereas the secondary references Roberts and Tomita fail to even provide teachings regarding the particle diameter size. See Blunt at col. 1, line 14.

The cited references also fail to motivate a person of ordinary skill in the art to make the presently claimed range of crystallinity as measured by X-ray diffractometry of less than 30%. Although Blunt teaches copolymers having crystallinity less than

90%, Applicants note that the range of less than 90% is an incredibly broad range of crystallinity which encompasses the entire universe of known resin compositions. Moreover, the specifically disclosed examples of Blunt do not even have crystallinity within the claimed range of less than 30% as stated in Applicants' previous Response. In particular, Example 1 of Blunt had crystallinity as shown below:

$$\text{Crystallinity (\%)} = C_{homo}(68\%) \times \frac{\Delta H(30)}{\Delta H_{homo}(38.3)} = \mathbf{53.8\%}$$

Examples 2-4 have crystallinity:

Example 2: $\Delta H = 27.6$, crystallinity = **49%**

Example 3: $\Delta H = 25.7$, crystallinity = **45.6%**

Example 4: $\Delta H = 22.7$, crystallinity = **40.3%**

Applicants note that graft modification would not change the range of crystallinity because the crystallinity of graft-modified polymers does not vary from those of unmodified product. See page 100, line 17 and page 101, line 16 of the specification.

The notable feature not taught nor suggested by Blunt is that the presently claimed range of crystallinity as measured by X-ray diffractometry of less than 30% produces films having heat sealing and fusion temperatures that are less than half the melting temperature of known resins. For example, Blunt teaches at col.

14, lines, heat sealing temperatures of 180° C, 150° C, 150° C, 150° C, 150° C for Samples A, B, C and D, respectively. In contrast, the presently claimed films have low heat sealing temperatures as well as vastly improved adhesion strength as measured in g/15mm. See Table 1 on page 103 of specification. This incredibly useful as well as unexpected combination of lowered fusion and heat sealing temperatures with high adhesion strength is simply not contemplated by the prior art. Blunt clearly fails to provide any suggestion of motivation to a person of ordinary skill in the art to make the presently claimed limitations.

Roberts and Tomita also fail to provide any suggestion or motivation to make the claimed limitations. Roberts only discloses a reaction of a polymer having ethylenically unsaturated bond with a chain-transfer agent in the presence of a free radical while Tomita solely discloses a functionalized polymer obtained by oxidation or sulfonation of terminal double bond, or by addition reaction of functional group containing compound to double bond. Further, the unmodified polymer of Tomita is C_{3-20}-α-olefin polymer whereas the present invention relates to the completely different ethylene/α-olefin copolymer.

Applicants note that claimed limitations are not mere optimization of results effective variables because one of ordinary

skill in the art would not have expected that the claimed range of crystallinity of less than 30% coupled with intrinsic viscosity (η) as measured in decalin at 135°C in the range of 0.2 to 5.0 dl/g, particle diameters measured by a Coulter Counter of 1 to 50 μm and a polar monomer graft component in the range of 0.1 to 15% by weight would result in a low temperature heat sealing resin composition or film having high adhesion properties. In other words, the cited references fail to teach that optimization of intrinsic viscosity (η), particle diameters, crystallinity and polar monomer component give rise to lower heat fusion and melting characteristics while maintaining high adhesion strength. See In re Antoine, 195 UPSQ 6 (C.C.P.A. 1977).

Applicants further note that these limitations are not merely newly discovered properties nor are they inherent to the teachings of Blunt, Roberts or Tomita because a person of ordinary skill in the art would not have been able to make the claimed invention from the references alone without undue experimentation. United States v. Telectronics, Inc., 8 USPQ2d 1217 (Fed. Cir. 1988).

But even if an allegation of *prima facie* case of obviousness is maintained, Applicants rebut that presumption with evidence that the presently claimed limitations unexpectedly result in improved low-temperature heat-sealing properties. As shown in Comparative

Example 1 of the present specification, the low-temperature heat-sealing property of known ethylene/1-butene copolymers are clearly inferior to those of the presently claimed modified copolymer.

For example, Table 1 on page 103 of the specification shows that copolymers not within the presently claimed molar ratios have far inferior adhesion strengths. At 100° C, the low temperature sealing property for Comparative Example 1 is only 50 g/15mm whereas the presently claimed Example 1 has a **500%** increase in adhesion strength of 250 g/15mm. This is clearly an unexpected result not contemplated by the prior art. One of ordinary skill in the art would not have been motivated to make the claimed invention based on the teachings of the cited references. The unexpectedly superior advantage of low temperature heat sealing and high adhesion strength rebuts any allegation of *prima facie* obviousness.

Accordingly, Applicants respectfully submit that the presently claimed invention is non-obvious over Blunt in view of either Roberts et al. or Tomita et al. and respectfully request reconsideration and withdrawal of the rejections of claims 1-14 under 35 U.S.C. § 103.

2. Rejection of Claims 15 and 16 under 35 U.S.C. § 103(a)

The Office Action rejects claims 15 and 16 under 35 U.S.C. § 103(a) as being unpatentable over U.S. Patent No. 3,475,369 ("Blunt"), U.S. Patent No. 3,328,362 ("Roberts"), and U.S. Patent No. 5,252,677 ("Tomita et al.") as applied above in paragraph 4, and further in view of JP 63-378 ("Akazawa et al."). The Office Action states:

> Blunt, Roberts, and Tomita et al. teach all of the limitations in claims 15 and 16 except for a specific teaching of using maleic anhydride as the polar monomer. However, it is noted that Roberts generally teaches using anhydride as the polar monomer (column 3, lines 26-27), Blunt as modified by Roberts or Tomita et al. are not limited to any particular polar monomer, and maleic anhydride is a well known polar monomer used in graft polymerization of copolymers such as those taught by Blunt. One of ordinary skill in the art at the time the invention was made would have readily appreciated using as the polar monomer taught by Blunt as modified by Roberts or Tomita et al. maleic anhydride as maleic anhydride is a well known polar monomer used in graft polymerization of olefin copolymers as shown for examples by Akazawa et al.
>
> Akazawa et al. are directed to graft polymerization of an olefin resin with a monomer such as maleic anhydride to increase the adhesiveness of the resin (see Abstract).

Applicants respectfully traverse the rejection for the same

reasons as given *supra*. Since the claims 15 and 16 depend from the independent base claims and thereby incorporate all the limitations, the same arguments made over the independent claims 1 and 7 are applicable to dependent claims 15 and 16. In particular, independent claims 1 and 7 recite a graft modified ethylene/α-olefin random copolymer having a particle diameter measured by a Coulter Counter of 1 to 50 μm. None of the cited references teach a particle size limitation within the claimed range and instead teach much smaller diameters of 0.02 to 0.5 μm. See Blunt at col. 1, line 14.

Furthermore, the presently claimed range of crystallinity of less than 30% in the base claims is a non-obvious range of a broader disclosed range. Although Blunt discloses the extremely broad range of a crystallinity of 90% or less, the presently claimed range of less than 30% unexpectedly results in a graft modified ethylene/α-olefin random copolymer having a melting point of not higher than 90° C while having high adhesion strength. This unexpected combination of low fusion temperatures and high adhesion strength allows for a film made from the copolymer to be heat sealed at low temperatures.

In contrast, known resins such as those shown in the Table at col. 14, lines 1-10 of Blunt, all have heat sealing and fusion

temperatures that are **twice** the melting temperature of the presently claimed resins *e.g.* fusion temperature at 180° C. The unexpectedly low heat sealing temperature along with unexpected adhesion strength of the presently claimed invention clearly rebuts an alleged *prima facie* case of obviousness.

Turning to the rule, the Federal Circuit held that a *prima facie* case of obviousness must establish: (1) some suggestion or motivation to modify the references; (2) a reasonable expectation of success; and (3) that the prior art references teach or suggest all claim limitations. Amgen, Inc. v. Chugai Pharm. Co., 18 USPQ2d 1016, 1023 (Fed. Cir. 1991); In re Fine, 5 USPQ2d 1596, 1598 (Fed. Cir. 1988); In re Wilson, 165 USPQ 494, 496 (C.C.P.A. 1970).

Since all the independent claims are unobvious over the primary reference, the dependent claims 15 and 16 are similarly unobvious.

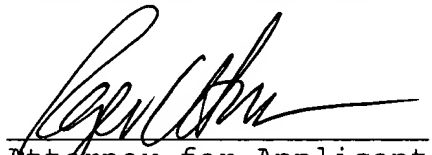
For all these reasons, Applicants respectfully submit that the presently claimed invention is unobvious over the cited references and respectfully request reconsideration and withdrawal of the rejections under 35 U.S.C. § 103.

CONCLUSION

In light of the foregoing, Applicants submit that the application is now in condition for allowance. The Examiner is therefore respectfully requested to reconsider and withdraw the rejection of the pending claims and allow the pending claims. Favorable action with an early allowance of the claims pending is earnestly solicited.

Respectfully submitted,

SHERMAN AND SHALLOWAY



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